Journal of the Lepidopterists' Society
34(2), 1980, 209–216

A REVIEW OF THE *ERORA LAETA* GROUP, WITH DESCRIPTION OF A NEW SPECIES (LYCAENIDAE)

Lee D. Miller

Allyn Museum of Entomology, 3701 Bay Shore Road,
Sarasota, Florida 33580

ABSTRACT. Members of the *laeta* group of *Erora* are discussed, especially their relationships with *Erora caudata*, n. sp. (Oxchuc, Chiapas, Mexico). Superficial and genitalic comparisons are made.

In lepidopterological matters Harry Clench's greatest devotion (apart from Bahamian butterflies in general) was to the Lycaenidae of Mexico. One of his "favorite" genera was *Erora*, and he long contemplated a revision of it and its relatives. Anyone who has ever examined a specimen (especially a female) of this extraordinarily beautiful group could appreciate Harry's infatuation with *Erora*.

Since I knew of this, when the Allyn Museum obtained a pair (more were to come later) of a strange *Erora* from Chiapas, Mexico, I immediately submitted them to Clench. His almost instantaneous reply was that not only was this insect a new species of *Erora*, but it also would cause a redefinition of the genus. One of the previously accepted characteristics was that *Erora* lacked "tails" on the hindwing, a feature of the new entity. We at once settled upon an informal name for this taxon, but Harry did not live long enough to provide even a rudimentary description of it. Accordingly, I describe this lovely hairstreak and discuss its relatives within *Erora*, dedicating this paper to the memory of Harry Clench, and trusting that he would not have been disappointed in the final product.

The *Erora laeta* group comprises three "look alike" species distributed in parts of the United States, Mexico, and Guatemala. They are slate-gray (males) to black with median blue markings (females) on the upper surface; on the under surface they are conspicuously scaled with blue-green, especially the hindwings, with overlying brick-red spots or chevrons. All share genitalic similarities in both sexes. These species cannot be confused with any other group of hairstreaks; most specimens can be determined within the group by their locality labels. The two previously described species are allopatric: *E. laeta* (W. H. Edwards) is confined to the northeastern United States and adjacent Canada, whereas *E. quaderna* (Hewitson) is found in the southwestern United States and montane Mexico, perhaps as far south as the mountains of Guatemala. These two species have been figured often (see plates in Godman and Salvin (1879–

1901), Holland (1931), Klots (1951) and Howe (1975)). An adequate genitalic analysis of *laeta* and *quaderna* (with figures of both sexes) was given by Field (1941). The conclusions reached by Field (1941) are modified, usually along the lines suggested by Clench (1943), but Field's figures are adequate for the discrimination of the previously described species.

Key to the *laeta* group of *Erora*

1. With tail at end of hindwing vein Cu_2; Chiapas (perhaps Guatemala) ..... *caudata*, n. sp.

1a. Tailless ..... **2.**

2. Fringes of wings above grayish, if orange present it is faint; eastern U.S. and adjacent Canada ..... *laeta* (W. H. Edwards).

2a. Fringes of wings above conspicuously orange ..... **3.**

3. Brick-red markings of under surface of ♂ somewhat more extensive; ♀ blue areas of upper surface more restricted and violet tinted; southwestern U.S. to Sinaloa, Mexico ..... *quaderna sanfordi* dos Passos.

3a. Brick-red markings of under surface reduced in ♂; ♀ blue areas of upper surface more extensive; montane Mexico (Nuevo Leon and south) (perhaps Guatemala) ..... *quaderna quaderna* (Hewitson).

Erora caudata L. Miller, **new species**

Figs. 1–4

Male. Head, thorax and abdomen covered with slate-gray hairs. Antennal shaft black, ringed with narrow white bands; club black with fulvous tip and two lateral fulvous bands (the latter not readily apparent to the naked eye). Palpi black with intermingled ventral white hairs. Eyes hairy, slightly emarginate, brown to red-brown, ringed laterally and mesially with white scales. Legs bluish-white, but black ringed with white distad.

Forewing upper surface slate-gray, darkest distad; otherwise unmarked. **Hindwing** with short tail at end of Cu_2; upper surface basically slate-gray, shiny in disc of wing, with narrow, intermittent, pale shining blue submarginal line from near tornus to about M_3; slight indication of darker submarginal spots from M_1-M_2 to Cu_2-2A (some or all spots not apparent in all specimens). Fringes of both wings fulvous; brick-red fringe hairs at hindwing tornus.

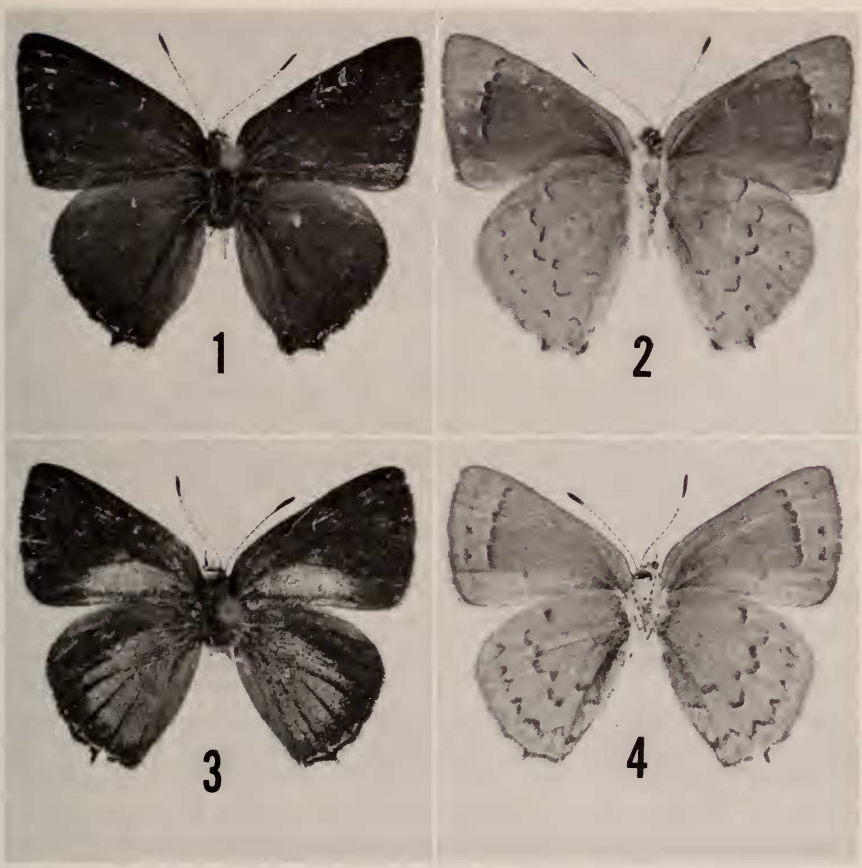
Forewing under surface dull gray, but broadly blue-green at apex and along costa; postmedian band of red-brown crescents, bordered distally with white, extending from $Rs-M_1$ to Cu_1-Cu_2. **Hindwing under surface** blue-green marked with red chevrons, spots and crescents outwardly edged in white (Fig. 2); light halos of distal band almost obsolescent. Fringes of both wings fulvous, but brick-red on tail and at tornus of hindwind.

Length of forewing. Holotype ♂ 13.3 mm, seven ♂ Paratypes 11.2 to 13.5 mm, mean 12.4 mm.

♂ **genitalia** (Fig. 5) closely resemble those of *E. laeta* and *quaderna* (Field, 1941: plate II). Falces without prominent shoulders and with apex not so strongly upturned as in *laeta* (similar to *quaderna*); valvae with apex more attenuated than in either of the other two species and not so strongly recurved dorsad.

Female. Head, thorax, abdomen and appendages as in ♂.

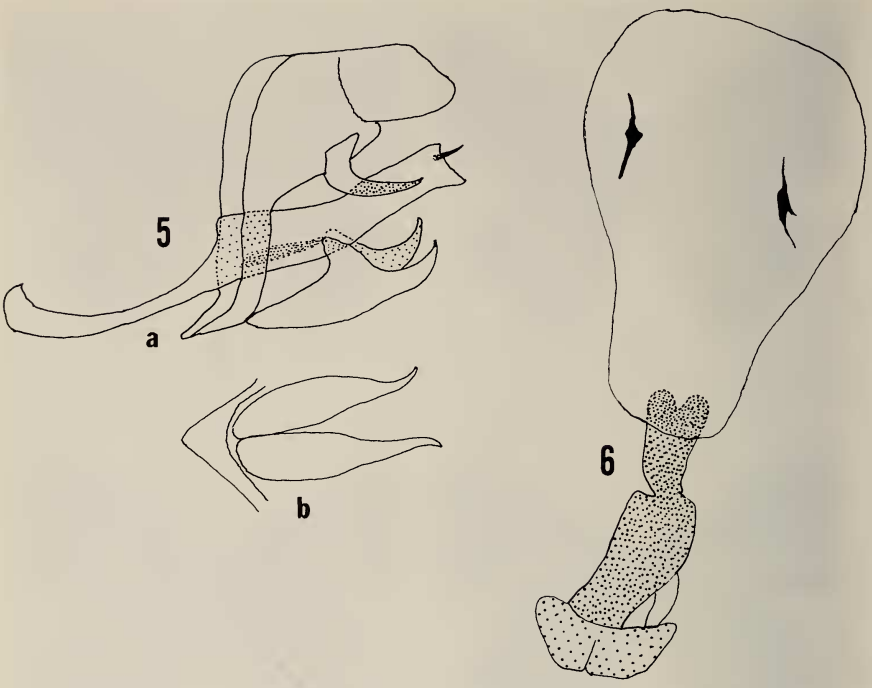
Forewing upper surface black-brown with blue area (more violet shaded than in either *laeta* or *quaderna quaderna*, about as in *quaderna sanfordi*) restricted to basal two-thirds of wing from inner margin to posterior margin of cell and transected by black veins. Basal three-quarters of **hindwing upper surface** violaceous blue (bluer in *laeta* or *quaderna*) with veins black; margins broadly blackish-brown, narrowing



FIGS. 1–4. *Erora caudata* L. Miller, new species. **1–2.** Holotype ♂, upper (1) and under (2) surfaces; MEXICO: CHIAPAS: Ochuc (Oxchuc). **3–4.** Paratype ♀, upper (3) and under (4) surfaces; same data as Holotype. Specimens in collection of Allyn Musuem of Entomology (Allyn Museum photos Nos. 121979-15 to 18, respectively).

tornally; irregular shining blue submarginal line from tornus to near M_3. Fringes fulvous on both wings; brick-red fringe hairs at hindwing tornus and intermingled with fulvous ones on tail.

Forewing under surface light gray, but broadly blue-green costad and from apex along outer margin; postmedian band of brick-red crescents outwardly edged in white nearly coalesced from near costa to Cu_2; faint dark gray submarginal spots from near apex to Cu_1–Cu_2. **Hindwing under surface** blue-green with two bands of brick-red chevrons (Fig. 4), the proximal ones distally edged in white (first and last two chevrons in proximal band offset proximally, tending to break continuity of the band; distal band of chevrons has a faint distal dusting of white scales, much more so than in other *Erora* species, which serves to emphasize the red chevrons as well as the submarginal blotches mentioned later) and faint dark gray submarginal blotches from near apex to near tornus. Fringes fulvous on both wings; brick-red fringe hairs at hindwing tornus and on tail.



FIGS. 5–6. Genitalia of *Erora caudata* L. Miller, new species. **5.** Holotype ♂ (preparation M-3997-v, Lee D. Miller), lateral view; a), ventral view of uncus and saccus. **6.** Paratype ♀ (preparation M-3998-v, Jacqueline Y. Miller), ventral view.

Length of forewing. 10 ♀ Paratypes 10.4 to 13.5 mm, mean 12.6 mm.

♀ **genitalia** (Fig. 6) have heavily sclerotized sterigma with posterior portion only rudimentarily bifurcated (see Field, 1941: plate III for comparison with *laeta* and *quaderna*). *Caudata* resembles *quaderna* with regard to sclerotization, but the simpler sterigma belies a close relationship. The sterigma of *laeta* is much less heavily sclerotized than either of its congeners. Signa vary little among *caudata*, *quaderna* and *laeta*.

Described from 18 specimens, eight males and 10 females, from montane Chiapas, Mexico.

Holotype ♂. MEXICO: CHIAPAS: Ochuc (properly "Oxchuc"), 21–23.ix.1972 (R. G. Wind); ♂ genitalia preparation M-3997-v (Lee D. Miller).

Paratypes. same locality and collector as Holotype, various dates, 6♂ 8♀; MEXICO: CHIAPAS: Mt. Huitepec, cloud forest, 8000 ft., 15–21.vi.1975 (P. Hubbell), 1♂ 2♀.

Holotype ♂, five ♂ and eight ♀ Paratypes will remain in the collection of the Allyn Museum of Entomology; one pair of Paratypes will be deposited each in Carnegie Museum of Natural History, Pittsburgh, Pennsylvania, and the British Museum (Natural History), London, England.

The name is feminine and refers to the presence of a tail at the end of hindwing vein Cu_2, a characteristic shared by no other member of the genus *Erora* previously described.

While the known distribution of *E. caudata* includes only Chiapas, I expect that it will be (or has been) found in adjacent Guatemala. Based on Godman's (1901, *in* Godman and Salvin, [1879–1901], vol. 2: 719) description of a specimen of *E. "quaderna"* from the Quiche Mountains of Guatemala, I am inclined to think that this specimen was *caudata*. I was unable to locate this specimen during a recent trip to the British Museum (Natural History), and until the specimen is located, the identity of the Guatemalan *"quaderna"* must remain a mystery.

Superficial characteristics alone will separate *caudata* from its congeners, especially the tailed hindwing. There are also differences in the genitalia of both sexes. I cannot, therefore, even assuming that the *"quaderna"* from Guatemala is actually a *caudata*, consider the *laeta* group as geographic segregates of a single species, though they undoubtedly are close relatives (members of a superspecies?).

Erora quaderna quaderna (Hewitson)

Thecla quaderna Hewitson, 1868: 35. Type-locality "Mexico," restricted to Tancitaro, Michoacan by Clench, 1943: 223. Holotype in British Museum (Natural History) [seen].

=*Thecla attalion* Godman and Salvin, 1887 [1879–1901], vol. 2: 60–61. Type-locality Orizaba, Veracruz, Mexico. Holotype in British Museum (Natural History) [seen].

Clench's (1943) restriction of the type-locality to Tancitaro in unfortunate, since it is unlikely that any of Hewitson's correspondents would have visited there. Other areas that harbor *quaderna* would have been better choices simply because Hewitson's collectors might have gone there, even ones relatively close to Mexico, D.F.

The male genitalia of *quaderna* (Field, 1941: plate II) have heavier upturned valves than *caudata* (Fig. 5), and have heavier valves and less elbowed falces than *laeta* (Field, 1941: plate II). The female genitalia of *quaderna* (Field, 1941: plate III) are distinguished from those of *caudata* (Fig. 6) by the deeply emarginate lamella postvaginalis; the entire sterigma is more heavily sclerotized in *quaderna* than in *laeta* (Field, 1941: plate III).

All of the specimens of *E. quaderna quaderna* that I have seen have come from the Mexican Plateau and adjacent cordillera north of the Isthmus of Tehuantepec. Specimens from Cerro Potosí, just southwest of Monterrey, Nuevo Leon, are referable to the southern subspecies, whereas material from Chihuahua and Sinaloa are not. The specimen recorded from Guatemala by Godman and Salvin (1887 [1879–1901]), as mentioned earlier, is probably a *caudata*. There seems to be no restriction of this species to cloud forest; indeed, it and its subspecies *sanfordi* are inhabitants of mesic to xeric environments where they seem to be associated with various Scrub Oaks (*Quercus*), and it is possible that at least one of these is the foodplant. The adults which I have encountered in Mexico are avid flower visitors, preferring those of a tall, yellow-flowered *Senecio* to other available blooms.

Erora quaderna sanfordi dos Passos

Erora laeta sanfordi dos Passos, 1940: 1. Type-locality White Mountains, Arizona. Holotype in American Museum of Natural History [seen].

This subspecies, if it is valid, is the northern representative of the Mexican *quaderna*, not *laeta* in which it was originally described (for details see Field, 1941). I have seen specimens referable to it from New Mexico, Arizona (there are also records from southern Utah) and northwestern Mexico (Madera, Chihuahua; Loberas Summit, Sinaloa). Material from northeastern Mexico is best classified as *E. q. quaderna*.

The characteristics that separate *sanfordi* from the nominate subspecies are slight and quite variable; hence, it may be necessary to compare sizable series to distinguish them. The attributes that seem to separate the two entities are summarized earlier in the key, but they are of a statistical nature. It is with some reluctance that I follow Clench (1943) and accept *sanfordi* as a subspecific name.

Erora laeta (W. H. Edwards)

Thecla laeta W. H. Edwards, 1862: 55–56. Type-locality near London, Ontario. Holotype in Carnegie Museum of Natural History [seen].
=*Thecla clothilde* W. H. Edwards, 1863: 15. Type-locality near Quebec, Quebec. Type lost (see F. M. Brown, 1970: 75 for details).

The reader is referred to F. M. Brown (1970: 74–75) for details of Edwards' confusion of the sexes of *laeta* (similar to Godman and Salvin's confusion of the sexes of *quaderna*).

E. laeta is a denizen of the Canadian and Transition zone deciduous forests of the northeastern United States and adjacent Canada. Its habitat is decidedly moister than that of *quaderna*. The southernmost records are from the mountains of northern Georgia, and specimens have been taken from as far west as the northern part of the lower peninsula of Michigan. It is primarily an Appalachian (and Laurentian) insect, and is associated with Beech (*Fagus*) woodlands. On the rare occasions that it is found commonly (a relative term, since these butterflies are never abudant), it seems to be attracted to flowers, at least to a limited degree.

Thus far little, if anything, has been published on the early stages of any of these butterlies (indeed, on any *Erora*), and some well-documented life history work on these hairstreaks would be most welcome.

The approximate distribution of the *laeta* group hairstreaks is given in Fig. 7. The captures of *Erora*, other than *laeta*, probably more closely resemble the distribution of hairstreak collectors who have

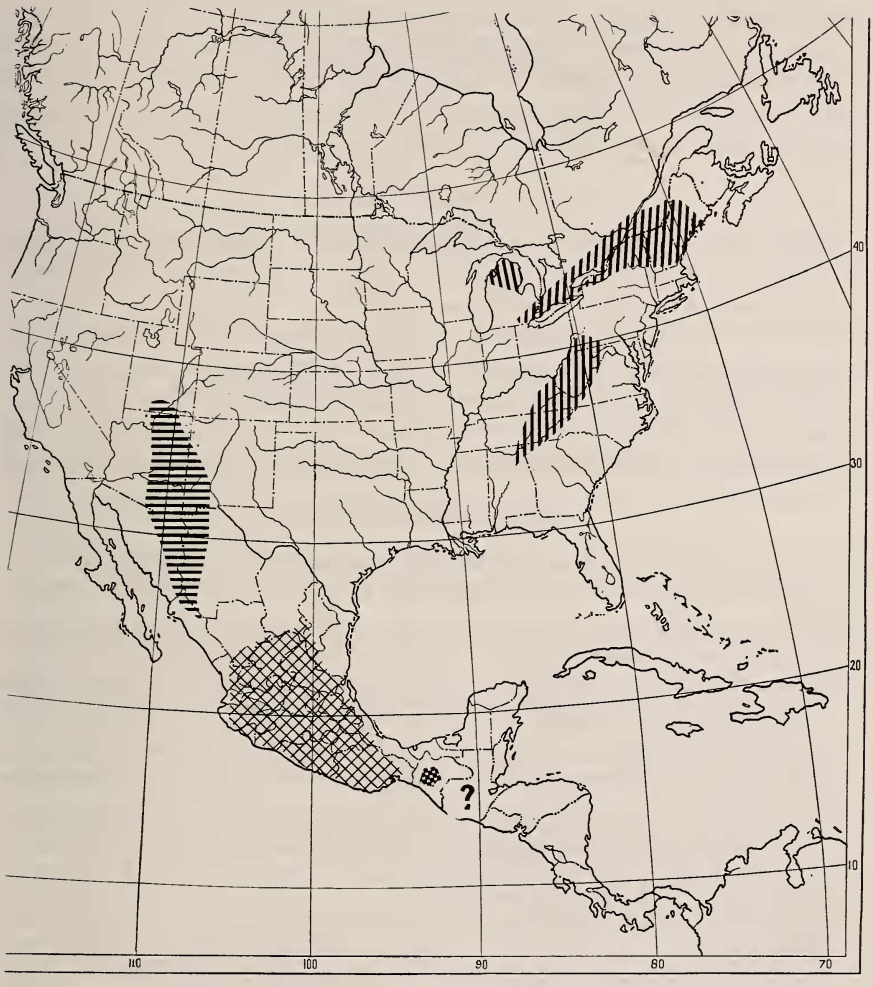


FIG. 7. Approximate distribution of members of the *Erora laeta* group. Vertical lines: *E. laeta*. Horizontal lines: *E. quaderna sanfordi*. Cross hatching: *E. quaderna quaderna*. Heavy stippling: *E. caudata*. The specimen of *E. "quaderna"* mentioned in text as probably *E. caudata* is denoted by a "?" in Guatemala. The ranges are not definitive: additional records may significantly expand known distributions, and since the beasts are very local, they do not occur everywhere within an indicated area.

ventured into the mountains of the southwestern United States, Mexico and Guatemala than of the butterflies themselves.

It is next to impossible to ascertain which of these insects is nearer the ancestral condition, but I suspect (based on the tailed condition,

characteristics cited of the male and female genitalia, *etc.*) that *caudata* may be the more "primitive" member of the group. The lightly sclerotized female genitalia of *laeta* suggest its position as most "derived," but the possibility exists that all three species may have been derived about equally from a common ancestor.

ACKNOWLEDGMENTS

I would like to thank the curators and staffs of the various museums for allowing me access to their *Erora* types and for other kindnesses not enumerated here. My wife and colleague, Jacqueline, as well as Dr. John C. Downey and Mr. A. C. Allyn read and commented upon the manuscript. Mr. Allyn performed the photographic chores. To all of these individuals I owe a great debt of gratitude. The actual impetus for this study, however, came from the late Harry K. Clench. Had he lived, he would have done this paper—all of us wish he had!

LITERATURE CITED

BROWN, F. M. 1970. The types of lycaenid butterflies described by William Henry Edwards. Part II—Theclinae and Strymoninae. Trans. American Ent. Soc. 96: 19–77.

CLENCH, H. K. 1943. A note on the Arizona *Erora* (Lepidoptera, Lycaenidae). J. New York Ent. Soc. 51: 221–223.

EDWARDS, W. H. 1862. Descriptions of certain species of diurnal Lepidoptera found within the limits of the United States and British America, No. 2. Proc. Acad. Nat. Sci. Philadelphia 14: 54–58.

——— 1863. Descriptions of certain species of diurnal Lepidoptera found within the limits of the United States and British America, No. 1. Trans. Ent. Soc. Philadelphia 2: 14–22.

FIELD, W. D. 1941. Notes on *Erora laeta* (Edwards) and *Erora quaderna* (Hewitson) (Lepidoptera, Lycaenidae). Ann. Ent. Soc. America 34: 303–316.

GODMAN, F. D. & O. SALVIN. 1879–1901. Biologia Centrali-Americana, Lepidoptera-Rhopalocera, 3 vols. London, Van Voorst.

HEWITSON, W. C. 1868. Descriptions of new species of Lycaenidae. London, priv. publ., 36 p.

HOLLAND, W. J. 1931. The butterfly book (rev. ed.). Garden City, N.Y., Doubleday, Doran and Co.: vii–xii + 424 pp.

HOWE, W. H. (ED.) 1975. The butterflies of North America. Garden City, N.Y., Doubleday and Co., vii–xiii + 633 p.

KLOTS, A. B. 1951. A field guide to the butterflies of North America, east of the Great Plains. Boston, Houghton Mifflin Co., vii–xvi + 349 p.

DOS PASSOS, C. F. 1940. A new subspecies of *Erora laeta* Edw. from Arizona and New Mexico. American Mus. Novitates (1052): 2 p.